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the case of dinitronaphthalene. It proves to be perfectly analogous in composition with nitrosophenylene; in properties also it is similar; and from its alcoholic solution it may be obtained in crystals, having a lustre somewhat similar to that of murexide: its formula, as deduced from our analysis, is



which we may arrange thus:— $\text{C}_{20} \text{H}_8 \text{NO}_2$, and so view it as naphthylamine in which 1 equiv. of hydrogen has been replaced by 1 equiv. of binoxide of nitrogen. This substance we term nitrosonaphthylene. It may likewise be obtained by the action of nitrous acid on naphthylamine, or of nitrite of potassium upon the hydrochlorate of naphthylamine: the following equations represent the three processes for its formation:—

1. $\text{C}_{20} \text{H}_6 2\text{NO}_4 + 8\text{H} = \text{C}_{20} \text{H}_8 \text{N}_2 \text{O}_2 + 6\text{HO}.$
2. $\text{C}_{20} \text{H}_9 \text{N} + \text{NO}_3 = \text{C}_{20} \text{H}_8 \text{N}_2 \text{O}_2 + \text{HO}.$
3. $\text{C}_{20} \text{H}_{10} \text{N, Cl} + \text{KNO}_4 = \text{C}_{20} \text{H}_8 \text{N}_2 \text{O}_2 + 2\text{HO} + \text{KCl}.$

February 28, 1856.

The LORD WROTTESLEY, President, in the Chair.

The following communications were read:—

- I. The following Letter was read, from Professor HANSTEEN of Christiania, For. Mem. R.S.:—

To the Royal Society of London.

As a Corresponding Member of the Royal Society, I have the honour herewith to transmit a Research “On the Secular Changes of the Magnetical System of the Earth, and more specially on the Secular Variation of the Magnetical Inclination in the Northern Temperate Zone,” separately printed from the ‘Memoirs of the Roy. Soc. of Sciences of Copenhagen.’ By calculating newer and more ancient observations of the magnetical declination, I have ascertained the movement of the four magnetical polar regions, which I had

already found in my work ‘*Untersuchungen über den Magnetismus der Erde*’ (Christiania, 1819, with Atlas); whereof the two northern ones have a motion from west to east, the two southern ones in the contrary direction; and have attempted thereby in general to declare the cause of the known variations, as well of the system of declination as of that of inclination and of intensity.

As I am indebted for the greatest part of the materials to English observations, I have found it my duty to render my thanks to English science, and to express my hopes of future exertions towards the solution of this, in my thought, most interesting problem of the general physics of the globe.

Most respectfully,

CHRISTOPHER HANSTEEN.

Observatory in Christiania,
December 31, 1855.

II. THE BAKERIAN LECTURE.—“On the Electro-dynamic Properties of Metals.” By Professor WILLIAM THOMSON, F.R.S.

The Lecturer gave an exposition of the substance of a paper presented by him to the Society under the above title.

The paper consists of five parts, namely:—1. On the Electric Convection of Heat; 2. On Thermo-electric Inversions; 3. On the Effects of Mechanical Strain and of Magnetization on the Thermo-electric Qualities of Metals; 4. On Methods for comparing and testing Galvanic Resistances, illustrated by Preliminary Experiments on the Effects of Tension and Magnetization on the Electric Conductivity of Metals; 5. On the Effects of Magnetization on the Electric Conductivity of Iron.

1. In the first part a full account of the experiments, of which the results were communicated to the Royal Society in April 1854*, is preceded by a short statement of the reasoning, founded on incontrovertible principles regarding the source of energy drawn upon by a thermo-electric current, which led the author to commence the experimental investigation with the certainty that the property looked for really existed whether he could find it or not. In confirmation of the extra-

* See Proceedings, May 4, 1854.